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The role of toxicologists and poison centers during and after a nuclear power plant emergency

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The events surrounding the nuclear power plant accident in Fukushima, Japan, uncovered a number of questions and issues that need to be addressed in the United States (US) regarding the preparedness and response to similar potential incidents. A recent commentary discussed some of these issues, including the lack of a sufficient number of radiation subject matter experts that are needed to provide guidance to other public health planners and responders.¹ Indeed, although no health effects from the exposure to radiation were expected to occur in the US, the Emergency Operation Center at the Centers of Disease Control and Prevention (CDC) in Atlanta operated at full capacity to support the needs of State and Federal partners both at home and abroad, particularly in Japan. During such events, the public will seek answers to numerous questions that can overwhelm existing resources like the CDC Info Line and the Radiation Emergency Assistance Center/Training Site (REAC/TS) emergency line.² In March and April 2011, a number of CDC toxicologists participated in the Japan Earthquake response in various roles while poison centers provided public health partners with daily updates on radiation exposure and information based on queries relating to radiation exposure and the use of potassium iodide.³

The role of poison centers in a nuclear power plant or other radiation emergency is well supported by a long and successful record of involvement during other public health incidents that range from infectious disease epidemics like West Nile virus to environmental disasters like the British Petroleum oil spill. In a radiation emergency, poison centers can educate callers about the proper use of medical countermeasures or antidotes, monitor for patterns of use and misuse of these therapies, and detect potential secondary adverse events from their use. Because of their existing technical resources and their experience in operating as a call center, they can assist in communicating important health messages and protective action measures to the public. Currently, the American Association of Poison Control Centers (AAPCC) collaborates closely with CDC in the area of surveillance and belongs to the recently formed National Alliance for Radiation Readiness whose mission is

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to enhance the Nation's radiological preparedness.⁴ Additionally, the AAPCC participated in the response to the Fukushima and the CardioGen Rubidium-82 contamination incidents.⁵ Further steps need to be taken by poison centers and their local and state partners to establish or solidify collaborations and formalize the role of poison centers in radiation preparedness and response alongside other stakeholders like Radiation Control Programs and Emergency Management Agencies.

On the other hand, toxicologists who are based in the outpatient or inpatient clinical settings can play additional roles during or after a nuclear power plant accident. Radiation injuries are part of the medical toxicology core curriculum, and toxicologists have ample clinical experience in the management of patients who were exposed or contaminated with chemicals. Many of these toxicologists are affiliated with hospitals and practice in the outpatient clinical setting where they evaluate and communicate risk from exposures to chemicals in individuals. Therefore, these toxicologists can advise health care providers and the public about the proper interpretation of screening criteria for contamination with radioactive material and can explain radiation detection results, including urinary bioassays, to these groups. Additionally, they can provide guidance on the use of personal protective equipment, decontamination and the proper use of medical countermeasures and radiation antidotes. In order to accomplish these goals, toxicologists need to advance, deepen and maintain their current level of knowledge about radiation injuries through additional and frequent training. They also need to solidify their relationship with other organizations involved with radiation response like the REAC/TS and the state Radiation Control Program.⁶

Without a doubt toxicologists and poison centers can play an important role during and after a nuclear power plant emergency. As we enhance our preparedness for such incidents as well as other radiation emergencies, poison centers will need to maintain a close collaboration with local and state partners in defining or expanding the role poison centers can play during similar events. Toxicologists will need to enhance their knowledge about the diagnosis and management of radiation injuries and exposures caused by a nuclear power plant incident or other types of radiation emergencies.

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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